Small Molecules

CHIR99021

WNT pathway activator; Inhibits GSK3

Catalog # 72052 1 mg
72054 10 mg

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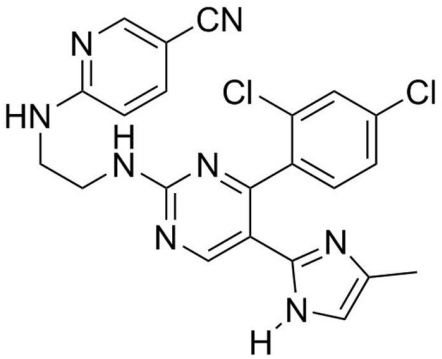
Product Description

CHIR99021 is an aminopyrimidine derivative that is an extremely potent glycogen synthase kinase (GSK) 3 inhibitor, inhibiting both GSK3β (IC_{50} = 6.7 nM) and GSK3α (IC_{50} = 10 nM). GSK3 is a serine/threonine kinase that is a key inhibitor of the WNT pathway; therefore CHIR99021 functions as a WNT activator. It shows little activity against a large panel of kinases including CDK2 and other serine/threonine

Molecular Name:	CHIR99021
Alternative Names:	CT 99021
CAS Number:	252917-06-9
Chemical Formula:	$C_{22}H_{18}Cl_2N_8$
Molecular Weight:	465.3 g/mol
Purity:	≥ 95%
Chemical Name:	6-[[2-[[4-(2,4-dichlorophenyl)-5-(5-methyl-1H-imidazol-2-yl)-2-pyrimidinyl]amino]ethyl]amino]-3-pyridinecarbonitrile OR 3-Pyridinecarbonitrile, 6-[[2-[[4-(2,4-dichlorophenyl)-5-(4-methyl-1H-imidazol-2-yl)-2-pyrimidinyl]amino]ethyl]amino]- (9CI)
Structure:	

Properties

Physical Appearance:	A crystalline solid
Storage:	Product stable at -20°C as supplied. Protect from prolonged exposure to light. Stable as supplied for 12 months from date of receipt.
Solubility:	· DMSO ≤ 20 mM For example, to prepare a 10 mM stock solution in DMSO, resuspend 1 mg in 215 µL of fresh DMSO. Prepare stock solution fresh before use. Information regarding stability of small molecules in solution has rarely been reported, however, as a general guide we recommend storage in DMSO at -20°C. Aliquot into working volumes to avoid repeated freeze-thaw cycles. The effect of storage of stock solution on compound performance should be tested for each application. Compound has low solubility in aqueous media. For use as a cell culture supplement, stock solution should be diluted into culture medium immediately before use. Avoid final DMSO concentration above 0.1% due to potential cell toxicity.

Published Applications

MAINTENANCE AND SELF-RENEWAL
· Maintains undifferentiated mouse embryonic stem (ES) cells in combination with PD0325901 (Catalog #72182), in the absence of LIF (Ying et al.).
· Promotes self-renewal of human ES cells and mouse epiblast stem cells in combination with IWR-1 (Kim et al.).
· Allows derivation of ES cells from refractory mouse strains (Kiyonari et al., Ying et al.) and rat (Li P et al.) in combination with other small molecules.
· Maintains human and mouse hematopoietic stem cells in cytokine-free conditions, in combination with Rapamycin (Catalog #73362) (Huang et al.).
· Promotes growth of mouse and human intestinal stem cells (Wang et al.).
REPROGRAMMING
· Enables chemical reprogramming (without genetic factors) of mouse embryonic fibroblasts to induced pluripotent stem (iPS) cells, in combination with Forskolin (Catalog #72112), Tranylcypromine (Catalog #72272), Valproic Acid (Catalog #72292), 3-Deazaneplanocin A (Catalog #72322), and E-616452 (Hou et al.).
· Promotes reprogramming of human somatic cells to iPS cells using OCT4, in combination with other small molecules (Zhu et al.).
· Generates mouse-like or “ground state” iPS cells from human and rat somatic cells, in combination with PD0325901 and A 83-01 (Catalog #72022) (Li W et al. 2009).
· With OCT4, transdifferentiates human CD34+ hematopoietic cells to mesenchymal stem cells (Meng et al.).
· Direct lineage reprogramming of fibroblasts to mature neurons, in combination with Valproic Acid, RepSox (Catalog #73792), Forskolin, SP600125 (Catalog #72642), Gö6983 (Catalog #72462), and Y-27632 (Catalog #72302) (Hu et al.).
· Direct lineage reprogramming of fibroblasts to mature neurons, in combination with Forskolin, ISX-9 (Catalog #73202), SB431542 (Catalog #72232), and I-BET151 (Catalog #73712) (Li X et al.).
DIFFERENTIATION
· Promotes differentiation of insulin-producing cells from human iPS cells (Kunisada et al.).
· Promotes differentiation of cardiomyocytes from human ES and iPS cells (Lian et al.).
· Generates and maintains primitive neural stem cells from human ES cells, in combination with SB431542 and Human Recombinant LIF (Catalog #78055) (Li W et al. 2011).

References

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Hou P et al. (2013) Pluripotent stem cells induced from mouse somatic cells by small-molecule compounds. Science 341(6146): 651–4.
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Kim H et al. (2013) Modulation of β-catenin function maintains mouse epiblast stem cell and human embryonic stem cell self-renewal. Nat Commun 4: 2403.
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